Oral Iron Therapy in Anaemic and Non Anaemic Pregnant Women

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Abstract- Anaemia is defined as decreased Hb% below 15.0g/dl in males and 11.5g/dl in females. The occurrence of anemia in pregnant women is attributed mainly to malnutrition. Anemia may contribute to maternal mortality and morbidity.

METHODS :

Role of oral iron therapy (Zincofer) in assessing the statues of pregnant mild anemic women was taken up as the study. The changes in the blood picture and indices in the subjects over the pregnancy period will probably provide a guidance for planning the dosage regime. The Cyanomethemoglobin method was used to measure the Hb level and RBC count was done using Hayems fluid. The study group comprised of 46 pregnant anemic and 44 non anemic women (age group 21 -35yrs)

RESULTS :

The change in the RBC count between the two groups was insignificant through out the pregnancy period. Physiological anemia probably explains the same. A significant increase in the Hb %, MCH and MCHC has been observed in all trimesters. This is indicative of increased iron absorption and probably decreased stored iron capacity. The difference between the two groups is significant in non anemic probably due to the utilization of the total therapeutic iron for pregnancy itself. The MCV level is also significantly high in the first two trimesters. The insignificant change in the third trimester is probably due to physiological reasons.

CONCLUSION :

The findings in present study indicate that oral iron supplementation during pregnancy increases Hb concentration, RBC count as well as the blood indices like MCV, MCH and MCHC in anemic as well as non-anemic pregnant women. Oral iron supplementation is advised in not only anemic but also non anemic women during pregnancy.

Index Terms- Anemia, pregnancy, Oral iron therapy, Hb concentration, RBC count, MCV, MCH and MCHC

I. INTRODUCTION

The World Health Organization (WHO) defines anemia in pregnancy as a hemoglobin (Hb) concentration of less than 11 gm/dL. Iron deficiency anemia defined as depletion of iron stores and signs of a decreased supply of iron to the tissues. Ferrous form of iron is important than ferric form for synthesis of hemoglobin. Iron deficiency anemia (IDA) is the most common type of anemia in pregnancy. The iron content of the body is normally kept constant by regulating the absorbed iron and loss of iron. Two known factors contributes to development of iron deficiency anemia (IDA) in pregnancy, woman's iron stores at the time of conception and amount of iron absorbed during gestation.

An increase in loss along with inadequate intake can lead to depletion of body iron stores and eventually to anemia. Iron requirements are increased during infancy, puberty, pregnancy, and during menstruation. The WHO estimates that 58% of pregnant women in developing countries are anemic mainly because of iron deficiency. Anemia affects over two billion people Worldwide. World Health Organization (WHO) estimated half of these are due to iron deficiency. I**n developing countries over 4 million pregnant women suffer from iron deficiency anemia (IDA).**

Anemia has a significant impact on the health of the fetus as well as that of the mother. It impairs the oxygen delivery through the placenta to the fetus and interferes with the normal intrauterine growth leading to fetal malformations and perinatal deaths. Anemia is associated with increased preterm labor (28.2%), preeclampsia (31.2%), and maternal sepsis. Severe anemia can lead to palpitations, tachycardia, breathlessness, and increased cardiac output leading to cardiac stress which can cause decompensation and cardiac failure. Anemia is responsible for 40%–60% of maternal deaths in non industrialized countries.
During the first 2 trimesters of pregnancy iron-deficiency anemia increases the risk for preterm labor, low-birth-weight babies, and infant mortality and predicts iron deficiency in infants[5,6]. It is estimated that anemia accounts for 3.7% and 12.8% of maternal deaths during pregnancy and childbirth in Africa and Asia respectively. Therefore it is important to diagnose and treat anemia to ensure the optimal health of the mother and the newborn. **Normal pregnancy needs extra 900 mg of ferrous iron. Hence daily routine oral supplementation with iron folic acid is beneficial. iron dose was calculated from the following formula: Weight before pregnancy (kg) × (120 g/L — Actual hemoglobin [g/L]) × 0.24 + 500 mg.**

II. MATERIALS AND METHODS

The study was conducted in the department of Physiology in collaboration with the department of Obstetrics and Gynecology, Konasima Institute of Medical Sciences, Amalapuram, E.G. Dist, Andhra Pradesh. This study was conducted on 46 pregnant women of reproductive age group with mild anemia (hemoglobin levels between 7-8 mg %), and 44 pregnant women of reproductive age group with out anemia (hemoglobin levels above 11gm %).

EXCLUSION CRITERIA : Patients with a history of anemia due to any other causes such as chronic blood loss, hemolytic anemia, and Thalassaemia, sickle cell anemia, were excluded from this study. Pregnant women with Hb < 7 g/dL (severe anemia), hepatic diseases , renal diseases, hematologic diseases, cardiovascular abnormalities, acid-peptic disorders, esophagitis, hiatus hernia, hypersensitivity to iron preparations.Written informed consent was obtained from all patients prior to screening and enrollment. The study protocol was approved by the Institute ethical committee.The primary efficacy parameter was the proportion of women achieving normal Hb level (> 11 g/dL) in the treatment groups. Other efficacy parameters were packed cell volume (PCV), mean corpuscular volume (MCV), mean corpuscular hemoglobin (MCH), mean corpuscular hemoglobin concentration (MCHC).

Tab Zincofer 150 mg was given on monthly basis, Compliance with study medication was determined by pill counting at each visit. Hb, PCV, RBC, were measured at the end of every trimester.

Hemoglobin concentration was measured by Cyanomethemoglobin method. PCV was determined by using Wintrobe's tube method and RBC count was done using haemocytometer. MCV was calculated using the following formula: MCV = PCV/RBC count x 10 (femtoliter). MCH was calculated by the formula: MCH = Hb Gm % / RBC count x 10 (picogram).

MCHC was calculated by the formula: MCHC = Hb Gm % / PCV % x 100.

III. RESULTS

Present study comprise of 90 pregnant women of reproductive age group. 46 pregnant women were having mild anemia (hemoglobin levels between 7-8 mg %) and 44 pregnant women were not anemic (hemoglobin levels above 11gm %). The study parameter were measured at the end of each trimester and the results are tabulated as follows

Table 1- showing parameters at the end of first trimester

FIRST TRIMESTER	RBC (Mean ± SD)	Hb (Mean ± SD)	MCV (Mean ± SD)	MCH (Mean ± SD)	MCHC (Mean ± SD)
Anemic	3.64 ± 0.38	7.76 ± 0.52	79.2 ± 3.45	20.9 ± 2.41	27.2 ± 3.61
Non-anemic	3.70 ± 0.32	10.6 ± 0.68	85.3 ± 4.82	27.8 ± 2.81	32.6 ± 3.21
P = Value.	0.0002	0.0001	0.0001	0.0001	0.0001

Table-1 & Table-2 depicts that increased hemoglobin in both anemic group from 7.76 ± 0.52 to 8..66 ± 0.42 and non anemic group from 10.6 ± 0.68 to 10.9 ± 0.72 after first trimester.

Increased RBC count in both anemic group from 3.64 ± 0.38 to 3.70 ± 0.32 and non anemic group from 3.70 ± 0.32 to 3.81 ± 0.35 after first trimester.

Increased MCV in both anemic group from 79.2 ± 3.45 to 83.2 ± 3.12 and non anemic group from 85.3 ± 4.82 to 89.3 ± 5.42 after first trimester.

Increased MCH in both anemic group from 20.9 ± 2.41 to 22.8 ± 2.64 and non anemic group from 27.8 ± 2.81 to 28.8 ± 2.61 after first trimester.

Increased MCHC in both anemic group from 27.2 ± 3.61 to 28.2 ± 3.41and non anemic group from 32.6 ± 3.21 to 32.8 ± 3.31after first trimester.

Table 2- showing parameters at the end of second trimester

SECOND TRIMESTER	RBC (Mean ± SD)	Hb (Mean ± SD)	MCV (Mean ± SD)	MCH (Mean ± SD)	MCHC (Mean ± SD)
Anemic	3.70 ± 0.32	8..66 ± 0.42	83.2 ± 3.12	22.8 ± 2.64	28.2 ± 3.41
Non-anemic	3.81 ± 0.35	10.9 ± 0.72	89.3 ± 5.42	28.8 ± 2.61	32.8 ± 3.31
P = Value.	0.0001	0.0001	0.0001	0.0001	0.0001

Table-2 & Table-3 depicts that increased hemoglobin in both anemic group from 8.66 ± 0.42 to 9..45 ± 0.51 and non anemic group from 10.9 ± 0.72 to 11.9 ± 0.62 after second trimester.

Increased RBC count in both anemic group from 3.70 ± 0.32 to 3.79 ± 0.36and non anemic group from 3.81 ± 0.35 to 3.98 ± 0.55 after second trimester.

Increased MCV in both anemic group from 83.2 ± 3.12 to 83.6 ± 4.12 and non anemic group from 89.3 ± 5.42 to 90.3 ± 4.22 after second trimester.

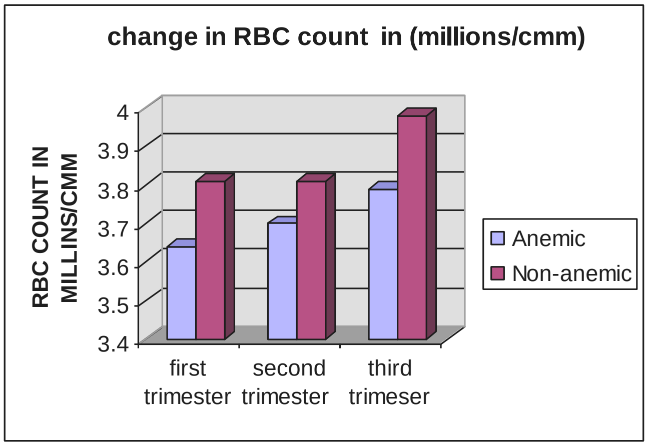
Increased MCH in both anemic group from 22.8 ± 2.64 to 25.8 ± 3.64 and non anemic group from 28.8 ± 2.61 to 30.8 ± 2.89 after second trimester.

Increased MCH C in both anemic group from 28.2 ± 3.41 to 30.2 ± 3.52 and non anemic group from 32.8 ± 3.31 to 33.3 ± 5.31 after second trimester.

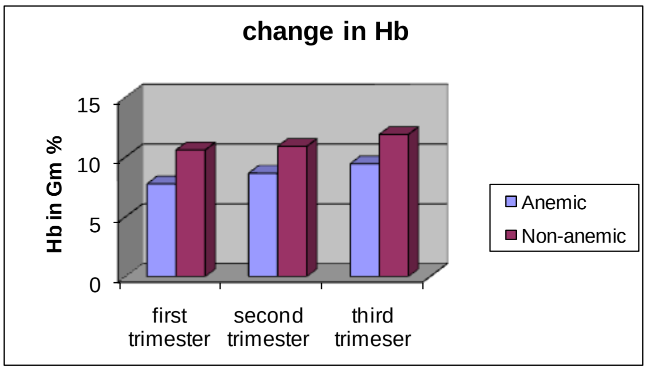
Table 3- showing parameters at the end of third trimester

THIRD TRIMESTER	RBC (Mean ± SD)	Hb (Mean ± SD)	MCV (Mean ± SD)	MCH (Mean ± SD)	MCHC (Mean ± SD)
Anemic	3.79 ± 0.36	9..45 ± 0.51	83.6 ± 4.12	25.8 ± 3.64	30.2 ± 3.52
Non-anemic	3.98 ± 0.55	11.9 ± 0.62	90.3 ± 4.22	30.8 ± 2.89	33.3 ± 5.31
P = Value.	0.0002	0.0001	0.0001	0.0001	0.0001

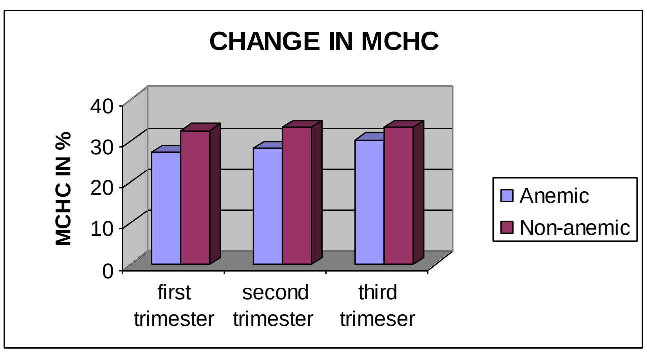
Graph 1 shows change in RBC count in three trimesters after treatment with oral iron preparation



Graph 2 shows change in Hb in three trimesters after treatment



Graph 3- shows change in MCHC in three trimesters after treatment with oral iron therapy



The results shows that there was a significant increase in RBC count in both the groups (anemic & non anemic group) after treatment with zincofer [graph-1 and 2], during three trimesters and is highly significant. The increase in Hb was also statistically significant in both the groups after treatment with Zincofer. The increase in the MCV, MCH and MCHC which was also statistically significant in both the group after treatment with zincofer [graph -3].

IV. DISCUSSION

In this study effect of Zincofer 150 mg as iron supplementation during pregnancy was studied in both anemic and non anemic pregnant females reporting in first trimester for routine ante-natal checkup. The subjects were supposed to take the iron supplementation throughout the pregnancy and monthly supply of tablets were made during there visit to hospital.

The effect of iron supplementation was studied by assessing the change in RBC count, Hb Concentration and blood indices like MCV, MCH and MCHC at the end of each trimester. Hemoglobin concentration was increased in anemic and non-anemic women after oral iron supplementation in every trimester. This can be explained on physiological basis of pregnancy induced anemia which is due to haemodilution due to increased extra cellular fluid in pregnancy. RBC count also increased after treatment with Zincofer, the rise in every subsequent trimester was statistically significant. This may be due to iron supplementation as the iron requirement during pregnancy is increased and if the iron is not taken during pregnancy anemia may develop. Significant increase in MCV, MCH and MCHC is due to iron supplementation as this will increase the rate of synthesis of hemoglobin as well as the rate of erythropoiesis which will increase the RBC count which will improve the deranged values of blood indices.

V. CONCLUSION

The findings in present study indicate that oral iron supplementation during pregnancy increases Hb concentration, RBC count. Blood indices like MCV, MCH and MCHC are also improved in anemic as well as non-anemic pregnant women. Oral iron supplementation is advised in not only anemic but also non anemic women, during pregnancy. **Prophylactic iron supplement and food fortification with iron improves the maternal and child health.**

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